WHAT IS CLAIMED IS:

1. A laser system which is a coherent light source used in one of a photodynamic therapy (PDT) and a photodynamic diagnosis (PDD), comprising:

a pump laser emitting at least a laser beam with a specific wavelength;

a wavelength converter converting said specific wavelength of said laser beam emitted by said pump laser into a wavelength adapted to said PDT and said PDD; and

an optical transmitting and outputting device receiving and transmitting said laser beam for illuminating at least a specific target through an optical outputting device located an end thereof.

2. The laser system according to claim 1 further comprising a first coupling lens located between said pump laser and said wavelength converter for passing therethrough said laser beam.
3. The laser system according to claim 2, wherein said first coupling lens has an anti-reflecting surface coating, a specific curvature and a specific focal length to receive and coincide an energy of said laser beam from said pump laser to said wavelength converter.
4. The laser system according to claim 1, wherein said optical transmitting and outputting device comprises at least a fiber for transmitting and at least a light pen for outputting.
5. The laser system according to claim 4, wherein said transmitting and outputting device is connected to said wavelength converter by means of a fiber pigtail.

6. The laser system according to claim 1 further comprising at least a second coupling lens to coincide said laser beam from said wavelength converter to said optical transmitting and outputting device.
7. The laser system according to claim 6, wherein said second coupling lens is connected with said optical transmitting and outputting device by means of a fiber pigtail.
8. The laser system according to claim 1, wherein said wavelength converter comprises at least a quasi-phase matching (QPM) crystal.
9. The laser system according to claim 8, wherein said wavelength converter further comprises a temperature controller to adjust said QPM crystal at a specific temperature.
10. The laser system according to claim 9, wherein said wavelength converter further comprises a micro-translation device to select a grating period from a multi-grating of said QPM crystal.
11. The laser system according to claim 8, wherein said wavelength converter further comprises a micro-translation device to select a grating period from a multi-grating of said QPM crystal.
12. The laser system according to claim 8, wherein said QPM crystal is a periodically poled lithium niobate (PPLN) crystal.
13. The laser system according to claim 1, wherein said wavelength converter utilizes one of a QPM-optical parametric generator (OPG) and a QPM-OPG series-connected with a nonlinear wavelength converter to convert said specific wavelength of said laser beam.
14. The laser system according to claim 13, wherein said nonlinear wavelength converter is fabricated by one of a second harmonic generation (SHG) and a sum frequency generation (SFG).

15. The laser system according to claim 13, wherein said wavelength converter is a monolithic QPM crystal having a plurality of gratings connected in parallel for being an OPG gain medium for said QPM-OPG.

16. The laser system according to claim 15, wherein each of said gratings further comprises multi grating periods for an OPG gain medium.

17. The laser system according to claim 13, wherein said QPM-OPG series-connected with a nonlinear wavelength converter comprises a plurality of series-connected grating periods, in which a first grating period is a QPM-OPG gain medium and another is a nonlinear converting medium.

18. The laser system according to claim 13, wherein said QPM-OPG series-connected with a nonlinear wavelength converter comprises a first QPM crystal for an OPG gain medium and at least a second QPM crystal for a nonlinear converting medium.

19. The laser system according to claim 13, wherein said QPM-OPG series-connected with a nonlinear wavelength converter comprises a QPM crystal for an OPG gain medium and at least a nonlinear crystal for a nonlinear converting medium.

20. The laser system according to claim 1, wherein said pump laser is one of a Nd:YAG laser and a Nd:YVO_4 laser for emitting a laser beam with a wavelength of 1.064 μm.

21. A laser system for a laser source used in one of a PDT and a PDD, comprising:

a pump laser emitting at least a laser beam with a specific wavelength;

a wavelength converter wavelength converter converting said specific wavelength of said laser beam emitted by said pump laser into a wavelength adapted to said PDT and said PDD; and

a laser resonator system, in which combined the wavelength converter, to enhance intensity of the laser beam; and

an optical transmitting and outputting device receiving and transmitting said laser beam for illuminating at least a specific target through an optical outputting device located an end thereof.

22. The laser system according to claim 21 further comprising a first coupling lens located between said pump laser and said resonator device for passing therethrough said laser beam.

23. The laser system according to claim 22, wherein said first coupling lens has an anti-reflecting surface coating, a specific curvature and a specific focal distance to receive and coincide an energy of said laser beam from said pump laser to said resonator device.

24. The laser system according to claim 21, wherein said laser system further comprises at least a second coupling lens to coincide said laser beam from said laser resonator system to said optical transmitting and outputting device.

25. The laser system according to claim 24, wherein said second coupling lens is connected with said optical transmitting and outputting device by means of a fiber pigtail.

26. The laser system according to claim 21, wherein said laser resonator system is an upright lens system comprising a pair of optical lenses.

27. The laser system according to claim 21, wherein said laser resonator system is an upright lens system comprising an optical lens and a dielectric coated lens suitable for optical reflection and penetration and located at an output facet of a QPM crystal used by said wavelength converter.

28. The laser system according to claim 21, wherein said laser resonator system is an upright lens system comprising a pair of dielectric coated lenses suitable

for optical reflection and penetration and respectively located at an output facet and a pumping facet of a QPM crystal used by said wavelength converter.

29. The laser system according to claim 21, wherein said laser resonator system is a circular lens system comprising four optical lenses.

30. The laser system according to claim 21, wherein said wavelength converter utilizes one of a QPM-optical parametric oscillator (OPO) and a QPM-OPO series-connected with a nonlinear wavelength converter to convert said specific wavelength of said laser beam.

31. The laser system according to claim 30, wherein said nonlinear wavelength converter is fabricated by one of a SHG and a SFG.

32. The laser system according to claim 30, wherein said wavelength converter is a monolithic QPM crystal having a plurality of gratings connected in parallel for being an OPO gain medium for said QPM-OPO.

33. The laser system according to claim 32, wherein each of said gratings further comprises a plurality of grating periods for an OPO gain medium.

34. The laser system according to claim 30, wherein said QPM-OPO series-connected with a nonlinear wavelength converter comprises a plurality of series-connected grating periods, in which a first grating period is a QPM-OPO gain medium and another is a nonlinear converting medium.

35. The laser system according to claim 30, wherein said QPM-OPO series-connected with a nonlinear wavelength converter comprises a first QPM crystal for an OPO gain medium and at least a second QPM crystal for a nonlinear converting medium.

36. The laser system according to claim 30, wherein said QPM-OPO series-connected with a nonlinear wavelength converter comprises a QPM

crystal for an OPO gain medium and at least a nonlinear crystal for a nonlinear converting medium.

37. A laser system for a laser source used in one of a PDT and a PDD, comprising:

a pump laser emitting at least a laser beam with a specific wavelength;

a laser gain medium absorbing said laser beam emitted by said pump laser for being excited to emit a second laser beam with a second specific wavelength;

a wavelength converter wavelength converter converting said specific wavelength of said laser beam emitted by said pump laser into a wavelength adapted to said PDT and said PDD;

a laser resonator system, in which combined the wavelength converter, to enhance intensity of the laser beam; and

an optical transmitting and outputting device receiving and transmitting said laser beam for illuminating at least a specific target through an optical outputting device located an end thereof.

38. The laser system according to claim 37, wherein said laser resonator system is an upright lens system comprising a pair of optical lenses.

39. The laser system according to claim 37, wherein said laser resonator system is an upright lens system comprising an optical lens and a dielectric coated lens suitable for optical reflection and penetration and located at an output facet of a QPM crystal used by said wavelength converter.

40. The laser system according to claim 37, wherein said laser resonator system is an upright lens system comprising an optical lens and a dielectric coated lens suitable for optical reflection and penetration and located at an pumping facet of a laser gain medium used by said wavelength converter.

41. The laser system according to claim 37, wherein said laser resonator system is an non-coaxial laser resonator system comprising an upright laser resonator system coupled with an optical lens external to said upright resonator device for resonator said laser gain medium to emit a laser beam with a third specific wavelength.

42. The laser system according to claim 41, wherein said external optical lens is a lens coated by a dielectric and located at a pumping facet of said laser gain medium.

43. The laser system according to claim 37, wherein said pump laser is a laser having a semiconductor emitting a wavelength of one of 808 nm and 809 nm.

44. The laser system according to claim 37, wherein said laser gain medium is one of Nd:YAG crystal and Nd:YVO_4 crystal.